Risks versus Rewards: Understanding the Predictors of Music Piracy

Research-in-Progress

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Abstract

It has been estimated that three out of four songs are downloaded illegally. The practice has become increasingly popular as the number of online services that allow individuals to obtain music free of charge has grown, and the illegal activity has become a socially embedded practice. Given the threat of legal consequences, individuals continue to engage in illegal music sharing practices. The purpose of this study is to identify statistically significant predictors of music piracy. We have begun our study by conducting a multiple regression analysis in order to examine the impact of several demographic indicators as well as several self-reported usage and knowledge indicators. We find that the number of music files owned and self-reported knowledge of music piracy are highly significant indicators of music piracy. This study will be extended to examine the impact of economic, legal, social, risk and ethics factors on music piracy.

Keywords

Music piracy, illegal file sharing, multiple regression.

Introduction

Over the past decade, numerous websites and file sharing networks have evolved that offer free music downloads. Software programs such as *FrostWire*, an open source BitTorrent file sharing application that allows users to download music for free, have been created to enable the sharing of digital files at no charge. Similarly, free applications for mobile devices allow users to obtain music at no charge instead of using pay services such as *iTunes*. Examples of these applications include *Free Music Download* and *Free Mp3*.

While the individual consumer sees an instant economic benefit by obtaining music files at no charge, there is a serious impact upon not only the music industry but the economy at large. The Institute for Policy Innovation (IPI) and The Recording Industry Association of America (RIAA) have estimated that illegal music file-sharing has resulted in $12.5 billion dollars of economic damage and loss of 71,060 jobs every year in the United States ("Who Music Theft Hurts," n.d.; Siwek, 2006).

When a consumer purchases a digital music file, he or she is essentially buying a one-user license to have that song from a particular artist. Therefore, downloading a song for free robs the music industry of that revenue. While at the individual level the illegal downloading of music files may seem rather innocuous, at the aggregate level there is a tremendous impact, affecting "…songwriters, recording artists, audio engineers, computer technicians, talent scouts, marketing specialists, producers, publishers and countless others," ("Who Music Theft Hurts," n.d.). Furthermore, it has been estimated that music piracy costs the U.S. government over $400 million annually in lost tax revenue (Holt and Morris, 2009). Therefore, governmental officials and the recording industry take illegal music file sharing very seriously, often

prosecuting offenders (King, n.d.). According to the RIAA, "Making unauthorized copies of copyrighted music recordings is against the law and may subject you to civil and criminal liability." A civil law suit could result in thousands of dollars in damages, while criminal charges may result in a felony record, accompanied by up to five years of jail time and fines up to $250,000 for each offence (RIAA.com).

According to the *Annual Music Study 2012* illegal music downloading decreased 26% in the previous year, citing free and legal streaming services such as *Spotify* and *Soundcloud* as the direct reason for reduced downloading in the United States ("Music File Sharing Declined"). However, "…other forms of digital theft are emerging, most notably digital storage lockers used to distribute copyrighted music" ("Who Music Theft Hurts," n.d.). Additionally, music piracy is not a United States phenomenon; therefore, on a worldwide scale the impact is even greater. In the United States as well as in countries such as the United Kingdom, steps are being taken to identify offenders through their Internet Service Providers (ISPs) and mobile providers (Garside, 2013).

It has been estimated that 75% of college students have downloaded music, videos, software, or other media from P2P file sharing sites. Since the creation of Napster in 1999, a site created by two college students who wanted to share MP3 files and obscure music, lawmakers have sought ways to deter college students from engaging in music piracy. Prior research has established a significant correlation between college students and music piracy (Vandiver, Bowman, and Vega, 2012), with the college student population being cited as disproportionately active in the music piracy phenomenon (Hinduja and Higgins,2011). However, explanations for this relationship remain unclear (Vandiver et al., 2012). Therefore, we have surveyed a sample drawn from a population of college students to attempt to identify predictors of music piracy in this population. We begin this study by examining several demographic indicators as well as several self-reported use and knowledge indicators. Demographic indicators that may have an influence on music piracy include gender, age, and class rank. Self-reported use and knowledge indicators include major, classes taken that discuss music piracy, self-reported knowledge about music piracy, and the number of digital songs owned.

Literature Review

Demographic Indicators

Music piracy involves the risks of being caught and penalized by copyright owners. Previous studies have shown that gender may matter, as males and females often react differently to risky activities (Dwyer, Gilkeson and List, 2002). For instance, males tend to exhibit sporadic behaviors in file sharing, while females are more likely to comply with expected risk and economic deterrent factors (Cadsby and Maynes, 2005). In addition, males are generally more ethically liberal than females (Kreie and Cronan, 1998) as males tend to make decisions based on their attitude toward an action while the decisions of females tend to be influenced by social norms (Loch and Conger, 1996). Since music piracy is currently illegal and considered unacceptable behavior, females may be less likely to engage in music piracy activities than males.

A person's ethical attitude is also associated with experience and age (Kohlberg, 1969). People who are younger tend to place more weight on perceived benefits than perceived risks with regard to illegal music downloads (Sheehan, Tsao and Yang, 2010). As a person grows older and learns from mistakes, his or her perception of risks could outweigh perceived benefits. In addition, age tends to influence ethical predisposition or attitude toward music piracy behaviors. Younger people are more likely to develop an optimistic bias toward illegal sharing of music files than do older people.

Self-reported Use and Knowledge Indicators

Three theories have been used to explain the causes of digital piracy: self-control (Higgins, 2006), techniques of neutralization (Moore and McMullan, 2009) and rational choice (Higgins, 2007). People who have low self-control often seek immediate gratification and are motivated by self-interest instead of looking toward long-term benefits (Gottfredson and Hirschi, 1990). Music piracy can bring immediate gratification; therefore, individuals with low self-control may be inclined to participate in a illegal activity. Justifications for committing delinquent acts such as music piracy are often used as a neutralization technique (Akers and Sellers, 2008). For example, many users commit music piracy behaviors because

they convince themselves to engage in the activity by using excuses (e.g. "I deserve it," and personal enjoyment) and deny to themselves any legal responsibility (Kini, Ramakrishna and Vijayaraman, 2004). Rational choice theory asserts that a person commits criminal behavior in order to maximize profits or gains and lessen losses (Piquero and Tibbitts, 1996). All three theories could help explain personal engagement in music piracy activities.

Education may promote a person's view of music piracy as an unethical behavior (Kolberg, 1969). Previous studies have shown that a negative relationship exists between education and software piracy rates across countries (Marron and Steel, 2000). As a person becomes more educated, he or she is more likely to form a negative attitude toward music piracy (Sinha and Mandel, 2008). In the case of the current study, students at a higher class rank may engage less frequently in music piracy activities. Additionally, classes in which students discuss music piracy is one way to deepen their understanding of the implications of the behavior and potential risks (e.g., prosecution, malfunctioning files, spyware, time and cost losses, etc.). Such classes can focus on improving awareness of consumer piracy risks (Jeong, Zhao and Khouja, 2012). As users increase their perceived knowledge about issues associated with music piracy, they could be more likely to make rational decisions and avoid making excuses for engaging in music piracy related activities.

There could be some relationship between the number of digital songs owned and the number of illegally downloaded music files. Previous research shows that pirating the first song has the largest piracy risk cost and the marginal cost of pirating more songs diminishes rapidly (Jeong, Zhao and Khouja, 2012). As the individual's amount of digital content is increased, however, there may be less motivation to download more songs illegally. Therefore, at interest is whether the number of digital songs owned is a good predictor for the number of illegally downloaded music files from the perspective of marginal utility and perceived piracy risks.

Research Methodology

Two hundred and forty undergraduate students at a United States public university participated in a survey designed to further understanding of the predictors of music piracy. Students represent an important part of the online population, and several studies, e.g., (Dai and Salam, 2009; Kovar, Burke, and Kovar, 2000) have utilized them as subjects in studies of online consumers. In fact, students and non-students have demonstrated identical patterns of online behavior (Ahuja, Gupta, and Raman, 2003). Indeed, online customers are generally younger and more educated than are conventional consumers (Kotkin, 1998; Kim, Ferrin, and Rao, 2009). In the context of the current study, college students may be the ideal subject, as it has been suggested that college students are the largest offenders of music piracy by population (Hinduja and Higgins, 2011). It should also be noted that our survey requires students to self-report their engagement in an illegal activity, so there could be some inherent biases associated with their responses. However, it has been proposed in the literature that self-reported methods are valid and reliable for measuring involvement in delinquent and criminal behavior (Gibbons, 1979; Sutherland, 1949). Seven surveys were unusable resulting in 233 usable surveys. Certain demographic (see Table 1) and self-reported usage and knowledge data (see Table 2) were collected.

Data Collected (CODE)	Item	Frequency
Age (AGE)	Under 18	0
	18-21	194
	22-25	31
	26-29	5
	30 or older	3
Sex (SEX)	Male	177
	Female	56
Class Rank (EDU)	Freshman	10

Data Collected (CODE)	Item	Frequency
	Sophomore	99
	Junior	90
	Senior	34
Major (MJ1)	Business	206
(MJ2)	Health Sciences	8
(MJ3)	Arts and Sciences	6
(MJ4)	Fine and Applied Arts	2
(MJ5)	Undecided	1
(MJ6)	Other	10

Table 1. Demographic Data

Data Collected (CODE)	Item	Frequency
Number of college classes taken that discussed music piracy or	1	74
legal issues related to music piracy (CLS)	2	82
(How many college classes have you taken that discussed	3 – 5 classes	12
music piracy or legal issues related to music piracy?)	More than 5	3
	None	62
Number of songs cumulatively on all digital devices (NUM1)	Less than 100	32
(How many songs do you have on all your digital devices, i.e.,	101-250	25
MP3 players such iPod, iPad, etc.?)	251-500	34
	501-1,000	45
	1,001 – 2,500	47
	More than 2,500	50
Number of songs illegally downloaded (NUM2)	None	142
(How many of the digital music files you own were illegally	Less than 100	19
downloaded?)	101-250	18
	251-500	18
	501-1,000	21
	1,001 – 2,500	15
	More than 2,500	0
Self-reported level of knowledge about music piracy (KNOW)	None	13
(I would rate my level of knowledge of music piracy as:)	Slightly	61
	Somewhat	106
	Very	53

Table 2. Self-reported Usage and Knowledge

IBM SPSS Statistics 22 was used to perform preliminary analysis and multiple regression analysis of the survey data. Prior to testing the model, certain assumptions were tested: dependent variable is measured on a continuous scale (number of illegally downloaded songs); independent variables are continuous, interval, ordinal or categorical; there is a linear relationship between the dependent and independent variables and the data does not contain significant outliers (examined scatter plots); independent variables are not highly correlated (see table 3); there is independence of observations (see Durbin-Watson statistic in table 4); and, residuals are normally distributed (histogram of residuals exhibited approximately normally distributed characteristics).

Variables	NUM2	SEX	AGE	EDU	CLS	NUM1	KNOW	MJ2	MJ3	MJ4	MJ5	MJ6
NUM2	1.000											
SEX	-.128	1.000										
AGE	.059	-.131	1.000									
EDU	.101	-.059	.504	1.000								
CLS	.002	.011	-.105	-.235	1.000							
NUM1	.595	-.048	-.014	.049	.014	1.000						
KNOW	.274	-.179	.080	.143	-.193	.202	1.000					
MJ2	-.017	.170	.144	.179	.097	-.180	-.052	1.000				
MJ3	.034	.035	-.065	-.028	-.092	.046	.094	-.031	1.000			
MJ4	-.008	.057	.049	.163	-.033	.063	.016	-.018	-.015	1.000		
MJ5	-.045	-.037	.096	.031	.018	-.111	.090	-.012	-.011	-.006	1.000	
MJ6	-.032	-.020	.034	.072	-.115	-.045	.088	-.040	-.034	-.020	-.014	1.000

Table 3. Correlations

Results

Multiple regression analysis was used to test a model comprising the impact of gender, age, class rank, major, classes taken that discuss music piracy, number of digital songs owned, and knowledge about music piracy (independent variables) upon the number of illegally downloaded music files (dependent variable). Major was measured on six levels; therefore, the data was transformed to dummy variables with Business being used as the comparison variable in conducting the regression analysis. The overall regression results are provided in table 4.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.632	.400	.370	1.334	1.866
Predictors: (Constant), MJ6, MJ5, MJ4, MJ3, MJ2, KNOW, AGE, CLS, SEX, NUM1, EDU					
Dependent Variable: NUM2					

Table 4. Model Summary

Table 4 shows that the multiple correlation coefficient value of *R* indicates good quality of the predictor variables, while the adjusted *R square* demonstrates that the model does explain 37% of variability in the dependent variable NUM2. Additionally, the results of the analysis of variance (ANOVA) show that the regression model overall is a good fit for the data, $F(11,221) = 13.392$, $p < .001$, indicating the prediction of the dependent variable is accomplished better than can be done by chance.

As seen by the collinearity statistics in table 5, there is no evidence of multicollinearity; thus, the regression model estimates of the coefficients are stable. The variables *NUM1 (number of digital music files owned) and *KNOW (self-reported knowledge of music piracy) were statistically significant predictors of NUM2 (the number of illegally downloaded music files), while the remaining independent variables, gender, age, education, majors, and classes offered little explanatory value in this model.

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistic
		B	Std. Error	Beta	t	Sig.	VIF
Dependent Variable: NUM2	Constant	-.903	.676		-1.335	.183	
	SEX	-.330	.214	-.084	-1.541	.125	1.097
	AGE	.060	.192	.019	.311	.756	1.386
	EDU	.072	.137	.034	.527	.599	1.501
	CLASSES	.022	.059	.021	.375	.708	1.139
	*NUM1	.576	.055	.579	10.515	.000	1.118
	*KNOW	.296	.113	.147	2.615	.010	1.159
	MJR2	.892	.515	.097	1.732	.085	1.151
	MJR3	.025	.559	.002	.045	.964	1.027
	MJR4	-.851	.966	-.047	-.880	.380	1.040
	MJR5	.012	1.364	.000	.009	.993	1.041
	MJR6	-.147	.438	-.018	-.336	.737	1.030

Table 5. Coefficients

Based on these results, we have determined that further analysis is needed. Although NUM1, the number of digital files owned and KNOW, self-reported knowledge of music piracy, are important predictors of music piracy in this preliminary investigation, the remaining independent variables had little to offer in the presence of NUM1 and KNOW. Additional survey data based upon economic, legal, social, risk and ethics factors is being transcribed and will be used for more extensive analysis through structural equation modeling (SEM).

Limitations and Future Research

It has been suggested that college students are the main offenders of music piracy by population, so furthering understanding of music piracy from the college student's perspective is important. However, the findings of this study may not be generalizable to other populations or the general public. Future research may want to replicate this study with a larger non-student-based population in order to increase generalizability. Additionally, the findings of our study showed that while the number of digital music files owned and self-reported knowledge of music piracy were important predictors of the number of illegally downloaded music files, the other predictors were not significant. This finding could be an artifact of the population sampled in our study. As the aging population becomes more active in online activities, understanding the engagement of older people in music piracy will become more important. Additionally, future research may include other student types such as elementary, junior high, and high school students. Findings based on a wider sample may add to the body of knowledge on music piracy. Furthermore, variables that deter behavior such as fear of punishment may be important for inclusion in a future study. Finally, new forms of music distribution have evolved due to the file sharing phenomenon. More studies are needed that have considered the positive impacts of music piracy such as technology adoption and innovation.

Conclusion

The purpose of our study is to further understanding of the predictors of music piracy. Given that college students have been acknowledged as the leading offenders of music piracy, it is important that we examine this population. Results from a multiple regression analysis showed that self-reported knowledge of music piracy as well as the number of digital music files owned have predictive value for the number of illegally downloaded files among a college student's digital music files. While, the consequences to the individual for pirating music have become increasingly severe, efforts to deter music piracy have been largely ineffective. Additionally, studies have shown that music piracy does have a notable impact upon the U.S. economy. Nevertheless, negative economic impacts as well as examples of those prosecuted have not halted the music piracy phenomenon. As innovations in technology continue to bring new ways to pirate music, it is important that we gain a deeper understanding of this important issue.

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